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ABSTRACT

This document contains the following papers on the educational computing course from the SITE (Society for Information Technology & Teacher Education) 2002 conference: (1) "Integrating Media Literacy into a Technology Course for Preservice Secondary Teachers" (Gregg Brownell and Nancy Brownell); (2) "From Video Tutors to Electronic Portfolios: Using Advanced Screen Capture in Support of Educational Technology Instruction" (John Bryner and Matthew Nickerson); (3) "Online Optional--Offering Choices" (Sue Espinoza and Elizabeth Pannell); (4) "Consistency and Communication: The Benefits of Using an Online Course Management System in a Multi-Section Introductory Computing Course" (Christina M. Goode); (5) "Technology in the Classroom: A Teaching Unit for K-12 Teachers: Professional Development" (Chien-Chih Lee); (6) "The IT Fundamentals Curriculum--Online Interactive Technology Skills Modules" (Laurie Ralston); (7) "The Establishment of Basic Computer Literacy"; (8) "Computer Science as a Discipline in Germany: The Perspective of the Professors" (Esther Ruiz Ben); (9) "Technology Skills Certificate: A Web-Based Student Demonstration of Basic Technology Skills" (Allen Steckelberg); (10) "A New Model for Pre-Service Educational Technology Classes" (Steve Whitaker and Mark Hofer); (11) "Can Standards Be Met and Evaluated through an Online Teacher Education Technology Course? A Case Study" (Caroline M. Crawford and Jana Willis); (12) "Training Teachers To Integrate Technology into the Classroom Curriculum: Online versus Face-to-Face Course Delivery" (Jana M. Willis and Lauren Cifuentes); and (13) "Web-Based Teacher Education Technology Course" (Caroline M. Crawford and Jana Willis). Several brief summaries of conference presentations are also included. Most papers contain references. (MES)

Educational Computing Course (SITE 2002 Section)

Wren Bump. Ed.

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The educational computing course for pre-service and in-service teachers continues to change and evolve as it tries to meet national technology standards, NCATE accreditation standards, the needs of the different school districts, as well as the needs of the individual candidates themselves. The designers of the educational computing courses, each at his or her respective universities, base their course revisions on input from all these entities (ISTE, NCATE, ISD's, candidates) in addition to feedback from candidates who have taken the course and colleagues who have taught a similar course. This section helps to further the change and evolution of the course with the theme still being the preparation of the beginning teachers and the professional development of the in-service teachers.

The papers for this year reflect this process, some more than others and some in very different ways. One paper by Ray advocates the establishment of a basic computer literacy exam. "As a result of this study it was determined that pre-service teachers should be tested on their overall basic computer literacy as well as participate in courses to enhance established computer skills in an effort to be well prepared to lead a twenty-first century classroom." She found that many teacher candidates, whom they hypothesized would be more computer literate that teacher candidates in the past, still did not many of the basic computer skills.

Other papers advocate changing the structure of the educational computing course. Whitaker and Hofer's paper describes a new model for pre-service educational technology classes in which "efforts are being made to tie the content of the class to the content of methods and content-area courses – which, if successful, will strengthen students' experiences with all classes". The paper by Crawford and Willis questions if standards can be met and evaluated through an online teacher education technology course. "The continual evolution of the national technology standards creates a continual state of flux within the world of instructional technology. However, this creative online environment offers the possibilities that may not be available within other specialization areas; namely, the opportunity to reinvent conceptual frameworks of understanding and creative endeavors."

And finally Brownell proposes integrating media literacy into the educational computer course for pre-service secondary teachers. He believes "an important step in doing this is application of an acquisition model of media literacy, where skills gained with technology (production) and knowledge about media messages and the system that brings us to them are presented in a positive way. At a time when the most powerful communication means to ever exist interacts with our students (and us) every day in literally thousands of ways, we must not teach about technology without recognizing this fact and the impact such interaction has on our personal, professional and civic lives. The course mentioned here is a natural place to start integrating these important concepts and skills into the education of future teachers. Knowing how, without knowing why, invites manipulation. Knowing how and why invites participation."

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Integrating Media Literacy into a Technology Course for Preservice Secondary Teachers

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Abstract: This paper, after briefly explaining the content, placement and delivery method of EDTL 367 - Computer Utilization in the Classroom - Secondary, presents a definition of media literacy and a rationale for integrating media literacy concepts and activities into the course. Examples of appropriate activities are given and a number of relevant resources for further information about media literacy are cited. As available, student and instructor reactions to a pilot introduction of media literacy concepts into the course are offered.

Introduction

Strong initiatives to integrate technology into the schooling of children in the U.S. have been constant for almost two decades, going back at least as far as the report "A Nation at Risk" (Gardner 1983; Martinez & Mead 1988). This discourse historically centers around the notion that skill with technology will be important for employment in the global economy and that therefore, skill with technology is, and will be, a necessary (and empowering) experience for our youth, especially as they become working citizens (Gilder 1993; Marshall & Bannon 1988; Naron & Estes 1986). Such interest has led to the general acceptance of the integration of a technology component into the K–12 curriculum and to the curriculum to prepare K-12 teachers (Brownell & Brownell 1998; Brownell, Haney & Sternberg 1997; Handler & Strudler 1997; Strudler, Handler, & Falba 1998; Ohio Department of Education 1996).

This movement, at times successful but always constant and kept in the public's sphere of attention consistently over time, does, however, have credible critics. Such critics question the reality of the proposed educational benefits of technology in schooling, the inequities of access to powerful technologies in school and in the greater society, and the sociological effects of a range of technologies in the schools and in society (Bowers 1993; Bromley & Apple 1998; Cohen 1987; Cuban 1986 2001; Giroux 1997; Marvin 1988; Ragsdale 1988; Sutton 1991).

Amid this debate, two (among other) intriguing areas emerge as a positive focus regarding both K-12 experiences with technology and preservice and inservice teachers' technology education. One area is the on–going investigation and use of technology in learning to help teach problem solving, critical analysis skills, and encourage creativity (Jonassen, 2000; Papert 1996; Papert 1980). This is especially interesting since some make a case that creativity is the determining factor in success in the global economy, not skill with technology (Reich 2000). The second area is that of broadening the scope and understanding of technology in the schools to include a media literacy perspective, which addresses important skills and issues beyond the "technology equals computers equals workplace skills" rationale/approach and also offers important opportunities for experiences with problem solving, critical analysis skills, and opportunities to enhance and encourage creativity. Integrating aspects of this second approach also offers the benefits of gathering insights from well–developed

bodies of research in areas such as communications, literacy research, popular culture, and curriculum studies (Brownell & Brownell 2002, in print; Brownell & Brownell 2001; Hobbs 1998; Hobbs,1997; Kubey & Baker 1999; Tyner 1998).

This paper will address the integration of media literacy into a required course for secondary majors, EDTL 367 - Computer Utilization in the Classroom – Secondary. A brief explanation of the course will be presented and followed by a definition of media literacy, relevant example activities, and several resources for further information about media literacy.

EDTL 367 - Computer Utilization in the Classroom – Secondary

The EDTL 367 course was originally piloted in the spring of 1994 and became a required course for secondary majors in 1995. The intent is to provide learning experiences regarding relevant pedagogical concepts, as well as skills with technology, tailored to preservice students who will teach grades 7–12, though most expect to teach at the secondary (8–12) level. Although not a methods course, it is scheduled within a methods block wherein students concurrently take a methods course and engage in field experiences. The course description is: "Impact of the computer on educational methods and applications in the classroom. Evaluation of software. Integration of the computer and associated technologies into the content areas."

Media Literacy

Media literacy may be defined as the ability to access, analyze, evaluate and produce communication in a variety of forms (Aufderheide & Firestone 1993). As a part of the curriculum for schooling children and adolescents, media literacy is well established in every major English-speaking country in the world, except in the United States. That has begun to change over the last several years (Tyner 1998; McBrien 1999). Across the U.S., media literacy has begun to be addressed in state standards, the K–12 classroom, and in teacher education (Brownell & Brownell 2000; Kubey and Baker 1999; Hobbs 1998).

Beyond the brief definition above, there are several concepts about media literacy that are important and which focus on the media messages generated through various media (T.V., video, film, music, the web, computers, radio, etc.): 1) All messages are constructions; 2) Messages are not representations of social reality; 3) Individuals negotiate meaning by interacting with messages; 4) Messages have economic, political, social and aesthetic purposes; and 5) Each form of communication has unique characteristics (Hobbs 1997). Developing an understanding of these concepts through reading, discussion, activities and hands-on experiences with relevant media and tools to create media, can be a powerful experience for preservice and inservice teachers.

Additionally, scholars such as McChesney (2000, 1999), Rushkoff (1996), and Beder (1998) would hold that understanding the system that allows us to interact with powerful media/technology is an essential part of media literacy. This will be especially true in any society working to establish and/or maintain a representative/participatory democracy where access to relevant information and knowledge of its source, accuracy, "spin," and intent are crucial for informed decision making by citizens.

Media Literacy & Computer Utilization in the Classroom – Secondary

The basis for understanding our interactions with media (such as the types of media/technology mentioned above) is developing the skill of critical analysis and applying it to such interactions. The creation of media products is an essential component of such learning (hence the definition of media literacy above which includes the ability to, "...produce communication in a variety of forms.") Because of the ubiquity of media, opportunities to tie meaningful media literacy experiences to every subject are plentiful. Some, and usually almost all, forms of media with which we regularly interact provide opportunities to address (to name a few) subjects such as science, literature, math, the arts, history, politics, economics, writing, and reading (both in the traditional alphabetic sense and also in "reading" of art forms such as movies), etc. This can often be done without creating a separate course of study. Rather, by introducing key media literacy concepts within any subject area, the existing curriculum in that area can be addressed from a media literacy perspective. One other

benefit of this approach is the comprehensive view that technology equals more than simply computing, while at the same time affording opportunities to use important, empowering technologies to create products that apply media literacy concepts and help develop problem solving and critical analysis skills, as well as encourage creativity.

Activities can be built around interaction with specific media/technology (T.V., video, film, the web, radio, computers, and so on) with attention to media literacy principles and media messages. In the broad sense, activities can include asking questions such as: What is the reason for (intent of) this media message?; What is its economic purpose?; What is its source?; What characteristics does the medium it is offered through possess?; How successful is it?; What is its target audience?; How can I appropriate the medium (technology) it uses for my own viewpoint?; etc.

In science, media messages can be examined in one or more formats (e.g., T.V. news, documentaries, film) about a controversial issues such as cloning (or toxic waste disposal, or nuclear power, or the extraction industries, or global warming). The use of different media techniques, and the various viewpoints expressed on the issue, can be compared to each other, and to the views of mainstream scientists. In math, the use of statistics can be explored in various media settings in relation to topics in politics (the 2000 election), the economy, the entertainment industry, advertising, and much more, to unravel the constructions where the numbers are used (or abused), such as commercials, stock market reports, political sound–bites, newspapers, etc. In literature, a greater understanding of film as an art–form can lead to a better understanding of novels and stories, both their structure and meaning, including their unstated purposes such as social control/influence or even blatant propaganda. As one teacher stated, "I can't teach a novel without students ending–up talking about films."

The web can be a rich source and an important source for understanding media literacy principles. Applications in library/research skills, writing and reading are obvious, as well as specific content found on the web. Students can take a topic (say commercialism in schools) and: 1) search the web to find sites on the topic; 2) analyze each site as a construction with an ideological/political, social, and economic purpose; 3) compare the site, as a construction, to student's views of social reality; and, 4) analyze the media techniques used in the construction of the site (not the technical techniques/design parameters) and evaluate the effectiveness of the site. Students can also compare sites on the same topic with different points of view. In a recent class, students did a similar activity to prepare for a debate (one side for, one against) on commercialism in the schools and then held the debate. The chance to look at the web in this way and to prepare for and then debate the topic proved highly motivational and sparked student involvement and excitement about both the topic and the idea of the web as a provider of carefully constructed media messages.

Students, after a brief introduction to public relations and propaganda techniques, perhaps from the view of advertising, or of politics, can make audio, video, or web–based constructions for a specific purpose, to convey their own media messages. Undergraduates can role play being secondary students and make a commercial for a calculus course, or for their school, or to support a levy issue (all of which teachers in our graduate media literacy course have had their secondary students do). Undergraduates could divide into two groups. One group could make a video attacking Wal-Mart's practice requiring that edits be made to lyrics and songs that they find objectionable before they will sell the CDs. A second group could make a video supporting the policy. (This is especially interesting when students learn that Wal-Mart is the largest retailer of CDs in the U.S. and is willing to use that power to gain compliance with their imposed standards from many artists and labels.) Adopting one of the many music video styles and the techniques of that medium, students can create a music video supporting a political candidate and, using the same results from the same research, create a music video against the candidate.

Resources

The brief sketch above is just that. Through the web especially, instructors and students can gain access to a wealth of materials about media literacy including background information, lesson plans and ideas, organizations and projects, videos, books, speakers, and, in a few cases, media literacy standards from forward looking states and districts. The following are a few places to get started on the web:

Center for Media Literacy: http://www.medialit.org

Media Literacy Clearinghouse: http://www.med.sc.edu:1081

Just Think Foundation: http://www.justthink.org

PBS Teacher Source–Media Literacy: http://www.pbs.org/teachersource/media_lit/media_lit.shtm

Media Awareness Network: http://www.media-awareness.ca
New Mexico Media Literacy Project: http://www.nmmlp.org
Instructional Materials in Media Literacy: http://www.cln.org/subjects/media_inst.html
MediaChannel.Org: http://www.mediachannel.org/classroom/front.shtml
Alliance for a Media Literate America: http://www.nmec.org

Conclusion

Media, and technology, are often referred to as "powerful," as in, "T.V. is a powerful medium." Gaining skills with technology, and learning about technology, must include an understanding of what makes media and technology powerful when we interact with them. Media literacy offers a way to gain this essential information; a way to get to the why, as well as the how, of modern communication media/technology; a way to understand how media messages are constructed, with what intent and success they spread; and a way to understand the system which brings us to these media messages.

An important step in doing this is application of an acquisition model of media literacy, where skills gained with technology (production) and knowledge about media messages and the system that brings us to them are presented in a positive way. At a time when the most powerful communication means to ever exist interacts with our students (and us) every day in literally thousands of ways, we must not teach about technology without recognizing this fact and the impact such interaction has on our personal, professional and civic lives. The course mentioned here is a natural place to start integrating these important concepts and skills into the education of future teachers. Knowing how, without knowing why, invites manipulation. Knowing how and why invites participation.

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From Video Tutors to Electronic Portfolios: Using Advanced Screen Capture In Support of Educational Technology Instruction

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Among the many burgeoning "support" applications that can enhance the technology training of preservice teachers there is new group of simple and inexpensive "advanced screen capture" programs that should not be overlooked. Also referred to as video screen capture or moving screen capture they perform a rather simple yet powerful service. Like "older" screen capture applications, video screen capture can record whatever is displayed on a computer monitor but instead of a single "screen dump" video screen capture allows the user to record the monitor's image over time and create, as the name implies, a movie of what is happening on the screen.

At Southern Utah University's College of Education we have employed advanced screen capture techniques to enhance our educational technology course. At present this technology is helping in three important areas: 1) it supports faculty and lab assistants in teaching the basic software applications required for information literacy, 2) it enables teacher candidates to create powerful artifacts for their electronic portfolios, and 3) it introduces a new tool for K-12 teachers.

Educational technology faculty first used this capture technique in support of basic software training. There are several software applications that are covered in all sections of the course and instructors are anxious for their students to master the basics as quickly as possible so the important issues of integrating technology into teaching/learning can be discussed and practiced.. As reported throughout the country and in the literature, students are coming to college with a wide range of information literacy and computer skills. While some arrive having already mastered many productivity and Internet applications there is still a significant percent that come with considerable reluctance where computers are concerned and with few or no computer skills.

In an effort to reduce class time devoted to software basics and to support intimidated or less prepared students the faculty have created small video vignettes using movie screen capture that demonstrate basic operations for each of the principle software applications used through out the course. These vignettes, or video tutorials, are saved as Quicktime® movies and made available to students through the Internet via online course syllabi. Students who are struggling or who just need a simple reminder can open the video tutorial whenever they need assistance. This is especially helpful when the teacher or lab assistant is not available. The tutorials open in a small display window and can be viewed simultaneously with the application they are learning for quick and easy reference. The Quicktime® format allows students to pause, reverse or fast forward the tutorial in order to view the exact process in question and to view it as many times and at what ever speed they wish.

Reports in the literature attest to the successful use of similar video vignettes to support classroom instruction in a variety of different disciplines. Their use in training teacher candidates is proving equally successful. The ISTE standards are a prime focus of our educational technology curriculum and as candidates progress through their course of study they not only learn and practice the use of technology in the classroom, they are also mastering the tools necessary for creating and maintaining an electronic professional portfolio. Advanced screen capture tools are proving very useful in preparing artifacts for their portfolios that demonstrate competencies described in the ISTE standards. For example, a student can create a screen capture "movie" documenting their step by step creation of a PowerPoint® presentation. Because these advanced screen capture applications can include a sound track, candidates can narrate the process and add important pedagogical notes and/or personal reflection to their computer demonstrations that are destined for their portfolios. Even more powerful is the use of advanced screen capture with sound to record their lecture synchronized to the presentation slides demonstrating their appropriate use in the classroom.

Every hardware, software, or Internet application introduced to our candidates is taught and practiced at four levels: 1) basic functions of the application is demonstrated by the instructor, 2) candidates demonstrate basic mastery through projects that require direct application to a teaching problem or situation, 3) use of the application in the

classroom is modeled by the instructor, and 4) candidates demonstrate appropriate use of the application in the classroom via individual or group projects (most often these projects reflect their emphasis or major area of study.)

Educational technology faculty at Southern Utah University are pleased with the teaching/learning outcomes resulting from our ongoing use of advanced screen capture as a part of our educational technology repertoire. Online tutorials, creating portfolios and modeling new teaching strategies make advanced screen capture software a very useful tool and we encourage educational technology faculty to consider this inexpensive and easy-to-use application as part of their instructional strategy.

Redesigning the Educational Computing Course to Incorporate the ISTE Standards

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Abstract

This paper describes the restructuring of the Educational Computing Course CUIN 6320 Technology in the Classroom, a graduate class at the University of Houston. The purpose of the restructuring was to model to the students the integration of the technology standards for instructional purposes so that they could learn what each standard meant to them as teachers and what it looked like in the classroom. There were many activities included throughout the semester that referenced the standards directly. There were also many opportunities for the students to reflect on the standards and how they applied to different instructional situations.

Proposal

In the next few years the state of Texas will be incorporating new certification tests that will require the prospective teachers to be competent in technology use and integration. Not only will the teachers need to know how to use the different technologies, they will have to be able to integrate those technologies into their classroom preparation, presentation and assessment. They will have to integrate in all areas of their lessons so that the students will be using the appropriate technologies as they learn, create, report and produce.

The semester began with a self-assessment based on the technology applications standards that have been adopted by the state of Texas. This gave the students an opportunity to reflect on their own skills and competencies while getting an overview of what the course would involve. Each class period involved some form of collaborative activity so the students could see how collaboration could lead toward more learning and involvement with the technologies and the standards. Individual activities gave students the chance to develop the technology skills that would be required for successful completion of the class. Collaborative extensions were assigned throughout the semester so that students would have to seek out resources in the community or at their schools. These collaborative extensions involved the use of technology in a practical way that could be applied even after the completion of the class.

A group project was begun in the middle of the semester that was based on the NETS-S learning activities. The students used collaboration in class and online to develop a learning activity that incorporated technology and met both technology standards and subject matter standards. The results of their efforts were compiled and added to the class website so that others could use them as a resource.

The final self-assessment and the final online portfolio tied the whole semester together and provided the students with a record of the development of their technology skills and competencies in technology integration. They left the course with a concrete product to share with others and use as a resource when they begin to teach.

Online Optional – Offering Choices

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Abstract: Online-optional class sessions provide students in classes offered via video distance education with an option of attending class in an online mode if they qualify as online-eligible. Students determine which instructional delivery mode they prefer, and then work to be eligible to attend class in that mode. Choices may be based on preferred learning style, or on personal or professional schedules that sometimes interfere with class attendance.
Student reactions, as well as lessons learned, are included.

Technology and education – these two words are frequent companions as the concepts are becoming increasingly intertwined. Although technology was once considered an add-on in education, a supplement to the established (classroom-based) educational system, its role has expanded greatly. Various types of technology may now serve as the basis for new modes of instructional delivery at varying levels and for differing purposes. Some of these are basically an expansion of the concept of Distance Education (DE), although the approach may vary drastically from the correspondence courses that began the DE movement in the 18th century, long before the term was coined in the 1960s. Moore and Kearsley (1996) trace the history of distance education from those early days when correspondence courses were conducted via postal mail, through the early use of audio and video in the Open Universities in the 1970s, through the appearance and improvement of two-way videoconferencing (a concept in wide use today), to the use of computer networks to provide access to instruction from home or other 'distant' locations (as in today's expanding field of online courses). Much has been discussed about the changing face of higher education, as some traditional classroom-based classes may be supplemented (or replaced) by alternative instructional delivery methods. Some people have suggested that there may even be a demise of the university as we know it today. The more optimistic, though, suggest that expanding options available to students will but enhance the role of universities.

Students are at the heart of any educational system. Even as the relationship between technology and education is changing, so are today's students. This is especially true of those in higher education – at both undergraduate and graduate levels. Many are juggling work and family, along with their university classes. Time and distance often provide potential barriers to further higher education. Students who are unable to travel to campus at times when classes are offered are looking for alternate approaches. Universities are addressing this need by expanding to offer web- and video-based courses that may be taken via distance education. Community colleges and universities are increasingly reaching out to offer classes either face-to-face or via distance education, with promises that students will be able to complete most if not all of their coursework without traveling to the originating institution's campus. In this day of increasing competition, these options are becoming more prevalent, but generally, the delivery-mode options are on a per-course basis. A course is offered either face-to-face, online, or via videoconferencing. Often a course is offered in one mode only – so that at some time, a student will have to take it in that fashion. With the growing numbers of returning students (those who have been out of school for many years), we are faced with people who feel they know how they best learn, and this may cause some internal conflict for a student who must take a course through a delivery mode with which he does not feel comfortable. With that in

mind, some courses are being offered via different delivery modes for different sections – so students can sign up for the method with which they feel most comfortable.

Instructors should consider the delivery modes that will best serve themselves, their students, and the content of each course. There are advantages and disadvantages to each mode, as well as to the way each of the elements (student, instructor, content) reacts to it. The role and/or relationship of the different delivery methods have been discussed by a variety of educators. Greek (2000) discussed this as a continuum:

> Rather than treating computer-and Internet-based education as a replacement for the classroom, I prefer to consider new technologies as creating the potential for a plethora of instructional delivery options. At one end of the spectrum would be a traditional face-to-face classroom environment that makes no use of new instructional technologies. These are likely to decline in number as students request Web sites, forums to post questions, etc., from all faculty and instructors. At the other end would be courses taught entirely using technology as a mediator between instructor and students. In between these two extremes are dozens of mixed mode options open for experimentation. Live classes may be less essential, and could therefore meet less frequently, in courses that feature email, discussions, chat, computer software, and/or video-conferencing. On-campus courses are also more likely to have distance learners in the classroom as Web-based video-conferencing comes more easily accessible. (p. 64)

This intermingling is occurring more and more frequently, and it is sometimes used to help prepare instructors and/or students for totally online or other distance education courses. This paper will describe a somewhat different approach – a video-based distance education class that includes some online optional class sessions, in which students who qualify as online-eligible may select the mode of instructional delivery for designated class sessions.

The Program

The need for qualified and certified teachers has become a major concern in many school districts, and programs to help alleviate the shortage are being developed. Some are aimed at recruiting people who have been working in other careers and who, for a variety of reasons, would prefer to change fields. One such program is emergency certification, where a person with a bachelor's degree takes education (and content area) courses leading to teacher certification, while actually teaching in a PK-12 (pre-kindergarten through 12th grade) classroom. Each required course is generally offered in one delivery mode – via traditional classroom, videoconferencing, or online – although some are offered in different modes for different sections.

Each delivery mode has its advantages and disadvantages related to students, instructors, and even content. Although most courses are taught using one primary approach, there is an increasing trend to include online activities within classes of all types. This may be an add-on optional activity, or may be an essential component of the course. Generally, though, every student participates in all the activities. Instructors, by integrating the Internet into their non-online classes, have the opportunity to take advantage of the unique characteristics that each delivery mode offers. Referring to similar situations, Chamberlin (2001) explained

> Many of us use the Internet to supplement our campus courses or teach hybrid courses, partially on-campus and partially online. Some of us teach fully on-campus and fully online courses at the same time. But all of us who teach in both worlds are double agents, caught in a struggle to bridge those worlds, and make effective use of both face-to-face and online environments to ensure successful teaching and learning.
>
> By taking advantage of the pedagogical strengths of on-campus and online teaching, instructors can offer students the greatest chance to discover their strengths and weaknesses as learners and the best opportunity to find their path to achieving success. (p. 11)

We have expanded this concept to include videoconferencing, along with online class meetings, and have discovered advantages and challenges for students and the instructors in our technology class for the emergency permit students.

The Students and the Course

Students in our teacher-education classes come from a wide geographical area, and some must travel an hour or more to get to class either on our main campus, or on a branch campus in a metropolitan area about an hour away. Most students have over-full schedules, with their families, their teaching duties, and their university classes, in addition to periodic extra evening job responsibilities (parent conferences, etc.). Their experience with technology varies greatly, from those who have never (or rarely) used computers, to those who used them on a daily basis in their previous careers.

As part of the emergency certification program, students are required to take a technology integration class at the graduate or undergraduate level (after completing or being exempted from an introductory computer skills class). The course is taught each semester in one of three different formats – either face-to-face (summer 1), online (spring), or via 2-interactive video (summer 2 and fall). Students with computer experience often opt for the online, or the videoconferencing class, while those with little experience often prefer *not* to take the online course, and often try to sign up for the undergraduate course (based on availability). Theoretically, the availability of different levels (graduate and undergraduate) and different delivery methods should help students address their scheduling concerns, and accommodate their learning preferences. However, we have discovered that this is not always the case – students often sign up for courses based on when, rather than how, they are offered.

But what about offering a course in which students have the option to choose the delivery mode for their class participation each week? This would provide flexibility for students, and it would also provide additional support for students who need it, as well as promoting collaborative activities to encourage development of networking skills to be used throughout their careers.

The concept was piloted during a summer subterm (4 hours a day, 4 days a week), with 2 online optional days per week. Several students took advantage of the opportunity, and it meant that students who were in class were able to receive more attention. It also encouraged people to complete activities quickly so that they would be eligible for the online option. To be online eligible, students needed to meet 3 criteria:

1. A student must have all activities/assignments completed satisfactorily, and
2. The student must have read the assignment message (sent out the evening before class) and feel able to complete all activities without assistance.
3. Send the instructor a message stating that the online eligibility criteria had been met, and saying that the online option was being exercised.

The course was taught via 2-way interactive video, with a facilitator (an ETEC Master's student who had previously completed the course and who had a technology position on her campus) at the remote site, and a computer lab available for use during (and before and after) class-time. The class focused on *Integrating Technology into Curriculum*, and activities were designed to relate directly to the students' activities in their k12 classrooms. Students were aware of the wide range of experiences, from those who have grown up with computers and feel they know everything (but may have uneven knowledge and skills), to post-baccalaureate career changers who have been in the business world for up to 20 years and who may not have touched a computer, to those who have used computers on a daily basis on their previous jobs and in their personal lives. The intimidation factor was great at first, but as the experienced students took the online option, the technology fearful gained confidence as they worked in the labs. Attending class gave them the opportunity to ask questions, and to share their joys and concerns with instructor, facilitator, and/or classmates. Online students expressed appreciation for that option – one student wrote, "I enjoyed today having the online option. I was able to get everything done....I do have a class at 1:00 and also had a teacher team meeting tonight...so I was a little late it finishing up." Another student did not feel the same, and said, "I do not feel confident enough to stay at home and work. I need to have more direction than what on-line gives to me." After coming to class that day, he did exercise his online option the next class, though. A student who wasn't quite sure, wrote, "I am going to attempt to do the 7-17 class online. The section 11-5 concerns me a little and if I have trouble I may come for the last part of class" – but he was successful at home and did not need to come for assistance.

As a pilot activity, this was considered successful, based on the student responses, as well as those from the facilitator who worked with students who attended the class sessions. The instructor had mixed feelings, and did not feel comfortable taking advantage of some of the specific characteristics of the video system – students were concerned that everyone did the same activities in the same way – but that may have something to do with the fact that it was such a condensed course in the summer, and there was little time to reflect on what had been happening, what they would be doing, and how this related to their professional teaching responsibilities. And it was close to the beginning of school, so people were getting ready to go back, but did not have access to their rooms (and

resources) yet. With the success of that summer session, though, we were ready to approach the fall in the same manner, with a few minor changes.

The Fall

As always, scheduling problems arose with the fall class. The course would again be offered via videoconferencing, and the facilitator at the remote site would handle the video sessions as well as the lab activities there. However, there were more students wanting into the remote site than we had computers. Therefore, before class began, I had already told some students that we would be having online optional classes several times throughout the fall semester. Several students who were not able to get into the class at the remote site registered in the section on our main campus (where we had twice as many computers available), since they understood that they would not have to drive to campus each week. It was interesting to note that two of those people, though, did actually come to campus each week for the first half of the semester.

At the first class meeting, it was announced that to address the range of technology skills, as well as the time and location problems of persons juggling teacher/parent/student roles, some class sessions would be offered as online-optional, where students who qualified as online-eligible would have the option of 'attending' class in any location of their choosing. To qualify, all work must be up-to-date, with no missing or incomplete assignments, and the student must have read through the assignments for the class and must feel confident about completing the activities without assistance or questions. The assignment was scheduled to be sent out the night before each scheduled class meeting, so that students could determine if they were online-eligible or if they would need to come to class. The plan was met with joy from some, and skepticism from others. To provide everyone with the opportunity to 'try it out', the first class period was devoted to providing people with the skills to negotiate online assignments in our course management system and on e-mail, and the second week of class was totally online for everyone – building on the skills from the first night of class. That gave everyone the opportunity to experience the online environment, and it was interesting to see that some of the doubters on the first night were among the most enthusiastic after the online experience. After that first online class, one student wrote in her weekly reflection,

> I am glad we had Monday night's class online. Since it was a holiday, I would have hated driving to Commerce, especially since the thunderstorm would have messed up our class time. This was certainly convenient. I was not able to complete the assignments on Monday, due to the server being down. As it happened, everything has worked out well. This assignment was different. I did like the quiz over the chapter, even though I barely passed it.

Another student wrote, "Good evening, Dr. Espinoza. I am mentally exhausted after tonight's activities but enjoyed every minute of it", and a third said,

> This is my first experience with an online system for class and I am thoroughly enjoying it. I like working at my own pace in learning the lesson so I can absorb the information when I feel more refreshed than on a Monday night after working eight hours.

Each of these students exercised the online option at times during the semester, but all felt there were times when they wanted the social and instructional atmosphere of the classroom (at the local and remote sites).

The third class meeting was a required session where everyone came together and it was interesting to see and hear about the differing reactions to the online class of the previous week. With everyone present, we were able to have some interactive activities over the video system, and the 2 sides began to work together as one group. However, there was not another required in-class attendance meeting until the 9th week, and the tone of the class changed because of the attendance options.

I had told students that the lesson would go out on Sunday evening, so they would have an opportunity to determine if they would be needing to attend class in person the following evening. However, as an instructor, I found this somewhat limiting – it was difficult to change assignments when they had already gone out. So on Sunday evenings, a preview message would go out, telling what type of activities we would be having in class – then the 'real' message would go out the next day. This was still somewhat confining, though, for I did not feel able to make spontaneous changes, based on new ideas, student needs, and other items that might surface close to classtime. However, I did make some adjustments – students were generally assigned to complete a chapter quiz (available at the publisher's site for our textbook), and students who were in class were able to work in pairs to

complete it. Other activities were carried out in groups by students in class, whereas the online students used chat sessions to meet with fellow onliners. One student, in her weekly reflection, said,

> I chose to go to class rather than exercise the online-optional class last week so that I could meet with real people concerning the scenario chat. I do not care for chatting online and find it cumbersome, slow, and difficult. I prefer to meet with others if possible; therefore, the drive to class was beneficial.

On the whole, though, students, were anxious to spend in-class time on actual hands-on assignments in the lab, and the video sessions often became a time to review the assignments and to answer questions about them. The number of online students grew slowly, but never quite reached the half-way mark, in terms of total class members.

The online optional class concept appeared to benefit students who wished to work from home, as well as the students who needed assistance (since the instructor/facilitator had fewer students with which to work during class, and could spend more time with them). There were other reasons for coming to class, though. One student said, "I like having the online optional classes, but after attending last week, I may decline online. I was able to finish most of the assignments in the lab, drastically reducing time spent on work and increasing time spent on studying." Her comments led to a discussion about time management, and what that means in online classes – and how it relates to contrasting comments – some the online folks talked about there being too much work, but the people who came to class didn't feel that was true. When people come to class, they spend a concentrated period of time on classwork, but when doing the same work online, there may be many distractions that extend the time that it takes to complete activities. Another student mentioned,

> This week activities were a little frustrating since I took the online option, and got a little behind on some activities that I did not clearly understand how to perform. but the reading was very interesting [had difficulty with assignments].

She learned to think more carefully about what she might and might not be able to do, and appeared in class more often.

Lessons Learned

The lessons learned have been many. The facilitator at the remote site asked, about half way through the course, if this didn't make double work for the instructor, and without thinking I said "Not really." However, that is not necessarily true – because the people who were online would often send comments and questions, and while I was online each evening (I'm online for one hour each evening for my online students – I was also teaching 2 totally online courses), they would send requests for chat sessions – and the questions would sometimes be about the week's assignment, despite the fact that they were to go to class if they had questions. We will set up some additional guidelines for online eligibility, and anticipate having one or more of my Master's students serve as online mentors. I will also develop more parallel activities that take advantage of the specific characteristics of the online and the video systems, and will have all student exposed to each, so that they can make informed choices.

One student summed it up, when she said,

> Although this course was part "regular" and part "distance learning", I would readily sign up for another course of this type. This course gives you options: go to class for assistance or do not go to class if you can complete the assignments on your own. This aspect of a course is the "best of both worlds".

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Consistency and Communication: The Benefits of Using an Online Course Management System in a Multi-section Introductory Computing Course

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Abstract

As the Internet evolves, more instructors are learning how to create Web pages to support classroom activities in order to communicate with their students and provide anytime/anywhere access beyond the four walls of the classroom. While this method has been a valuable resource for students, the multi-section course provides interesting challenges, especially when different instructors are responsible for each section. In this presentation, I will discuss how we use an online course management system as a tool to help us coordinate multiple sections of a required introductory computing course for all pre-service teachers at the University of Tennessee, Knoxville (UTK). I will also outline plans for expansion and discuss future initiatives for using online learning environments to support teaching and learning.

Background

At UTK, all teacher education students are required to enroll in an introductory computing course. Each semester, five to seven sections of the same course are offered, in order to keep class sizes small enough to meet the capacity of our computing facilities. Full-time instructional technology faculty and graduate teaching assistants take responsibility for different sections. In the past, though the overarching goal to help preservice teachers learn to use technology was consistent, it was not unusual to have varying sets of expectations in different sections, based on who the instructor happened to be. Although the variety of instructional methods and approaches had its benefits, students did not necessarily share a common set of skills and knowledge. When conducting a focus group session with a group of students during their student teaching internship year, it was apparent that students were exposed to different experiences although all had completed the same general course offering. Statements such as "we didn't do that" came up quite frequently as their peers recounted their technology class experiences. This type of situation cause ripple effects in other areas of the teacher preparation program. Without a core set of skills, methods faculty are less likely to be able to depend on students possessing a certain level of technological prerequisite skills from which they can continue to build.

In an attempt to coordinate efforts among multiple sections, we decided to adopt a course management tool to help us create a master template for the overall course. UTK has adopted Blackboard's CourseInfo, an online learning environment that can be customized, to provide courses with Web-based materials. The idea behind the template was to focus our efforts on providing a solid foundation that included all core skills and common requirements.

Expectations and Reality

Upon completion of the template, we were able to replicate the core site across five sections, at which point each instructor could take over and include their own additions to their own site. This method allowed us to find a good balance between consistency and flexibility, and allowed us to share resources without having to re-enter large amounts of information.

The key to using CourseInfo to enhance communication and consistency among the instructors is getting all the instructors to adopt it. This was the first and most pressing hurdle. Not all instructors adopted CourseInfo. Thus, although the course site was available to the instructor, it was not used in the course. For the instructors who adopted CourseInfo, the template worked well for both them and their students and provided a consistent look and feel to the

course. CourseInfo also provided several features to enhance the overall communication and coordination of each course for and between the instructor and the students. Instructors could use their CourseInfo sites to post quizzes, assignments, and notes; record grades; post additional links to their Web site; maintain a calendar; distribute announcements; access email, chat, and discussion boards; and take advantage of a Digital Drop Box to reduce unnecessary paperwork. Students learned to check their class Web site on a regular basis, as all tools were available for "one-stop-shopping" in the same location.

Another hurdle was underestimating the space needed to replicate the course material for each section. Instead of replicating large files within each section, we discovered it was best to place a copy of the larger files on the server and allow each section to link to the files.

Conclusions

Although two sections did not adopt CourseInfo, we considered the initial approach to be a success. Future plans include expanding the use of the online communication tools to provide discussion forums and chat sessions between the sections. Also, the current bimonthly instructors' meeting can be augmented with special chat sessions as needed. Though the course is taught in a lab setting, for certain topics, plans are underway to moving more instruction online through learning modules/tutorials and videoconferencing.

Preparing Teachers for Digital Distance Education

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ABSTRACT

Teachers today are required to integrate technology into their lessons at an ever-escalating rate. Teacher education institutions must prepare their students to teach in tomorrow's classrooms. Today's teacher education students will teach their students as they are taught in their universities today. The National Council for Accreditation of Teacher Education (NCATE) Task Force on Technology and Teacher Education, a group of educators from diverse institutions and backgrounds, was assembled to consider ways that NCATE can provide leadership and support initiatives to meet the technology challenge facing teacher education institutions. The first recommendation of this Task Force was to stimulate more effective uses of technology in teacher education programs.

Teachers in K-12 classrooms have an obligation to prepare their students for a successful transition from the college classroom into the real world of the 21st Century. The convergence of high-speed communication and Internet-based digital technologies is creating new platforms for the delivery of instruction. The University of Virginia's (UVA) Curry School of Education has developed an outstanding model for this recommendation through it's course offering entitled *Introduction to Digital Distance Education*. For the past two summers, the course has been offered simultaneously in a classroom at the Curry School, connected to a classroom at the UVA School of Continuing and Professional Studies Northern Virginia Center.

Learners in the class are increasingly able to use a wide variety of methodologies for collaborative education, such as streaming video and audio, online discussion forums, interactive simulations, and case evaluation. The course provides an introduction to these technologies for application in synchronous and asynchronous learning environments in education, business, and government. The course focuses on the proper application of these technologies to enhance the interactive learning experience of the students. The "new" role of the instructor is addressed, as the shared learning experience provided through the use of advanced digital technologies requires the teacher to become part of

the learning experience as a participant along with the students in the class. Practical examples of these instructional technologies are provided, including videoconferencing, electronic whiteboards, courseware tools, and discussion groups. Internet-based collaborative connections between UVA classrooms in Northern Virginia and the grounds in Charlottesville are used to model the process and provide practical experience for the student in the class.

Learning activities that have proven beneficial during the course include Web-Quest development, student reports applying chapter material from the text (Peloff, R. and Pratt, K. (1999). *Building learning communities in cyberspace*. Jossey-Bass), use of digital technologies for teaching the class and demonstrating through application of material in the class website (http://curry.edschool.virginia.edu/curry/class/edlf/589_idde/).

The presentation will focus on critical course development and delivery issues that the authors have discovered. Summary recommendations will be presented to help those interested in providing similar course experiences.

Technology in the Classroom:A Teaching Unit for K-12 Teachers¡¦ Professional Development

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I. Introduction

According to Duhaney (2001), more than 50% of teachers feel "not prepared at all" or "poorly prepared" to integrate and use technology in the classroom. Saye (1998) stated that four general factors must be considered before teachers will accept and use technology: time, preparation for future, knowledge, and availability. One goal of this article is to create a teaching unit that teachers who participate will feel more prepared to use technology in the classroom and to integrate it into their lessons. This course is designed as a professional development course for use with classroom teachers and school personnel at K-12. The purpose of the course is to develop in participants an understanding of the importance of technology integration in the classroom. The four goals of technology in the classroom are control, empowerment, enrichment, and efficiency (Saye, 1998). Upon completion of the course, the participants will be able to integrate technology into classroom instruction and feel prepared to use technology for instructional and personal use. Bennett (1999) emphasized that better use of technology by teachers can conserve time so they can focus on educating students.

II. Using technology to enhance professional practices

Based on International Society for Technology in Education (2000) standards, teachers should demonstrate understanding of technology operation and concepts, implement curriculum plans to maximize student learning, and use technology to enhance productivity and professional practices. This unit meets these standards by teaching participants to use the Internet, Netscape Composer, e-mail, and Microsoft Office applications to teach students and for daily organizational activities such as attendance and grades. Technology benefits teachers by not only providing information, but the real advantage is that these tools can save time and energy in order to offer guidance for research and communication.

Teachers need to be able to use technology in the classroom in order to prepare students for the 21st century. According to Sefton-Green (2001), technology is empowerment for students. Computers as Tutors: Solving the Crisis in Education purports the use of technology "for the welfare of students, teachers, and society" (Bennett, 1999, p. 2). The developers believe that students who learn using technology are better prepared for society. Students who are familiar with technology are able to understand its advantages and to apply their knowledge to real life.

This teaching unit is designed for k-12 teachers' and school personnel' professional development. The unit should require 25 to 35 hours of instruction time, depending on the time constraints of the instructors and targeted audience. The developers envision the unit being taught in parts throughout the school year. Although it can be taught in 3 to 4 consecutive days, the developers do not believe it will be as effective.

III. Understanding by design

This unit may be modified for use with children by changing the discussion and writing prompts. None of the activities are too difficult for a student at or above third grade level. Also, the final research topic might be modified to one more pertinent to students than professional educators. In addition, the unit may be modified for use in a pre-service education course such as Microcomputers in Education. Modifications may include more activities or shorter lessons.

The unit is designed to meet all six facets of understanding as follows:

Facet	Evidence
Explanation	Participants will relate current research to classmates.
Interpretation	Upon learning about the Internet, participants will interpret the information to brainstorm ways to integrate the Internet into the classroom on an understanding level. Participants will interpret current research to synthesize it for classmates.
Application	Participants will search the Internet, utilize e-mail, create a web page, compose a biography paper (Word), compose a biography presentation (PowerPoint), compare student performance (Excel), and conduct and synthesize research.
Perspective	Participants will evaluate a lesson for the instructor. Participants will locate and recommend web sites for classmates. (The teachers must evaluate the sites for use by other teachers. They must take into consideration the needs of others.) Participants will determine if research information will be useful to themselves or others.
Empathy	Participants will discuss perceptions of technology (fears, failures, successes). Participants will discuss amounts of technology available in their own school

	districts.
Self-knowledge	Participants will discuss reasons they do or do not use technology. Participants will evaluate web sites for usefulness in instruction. (The teachers must evaluate the sites for use in their own classrooms and instruction. They must consider what they will and will not use and why.)

When design this teaching unit, the following issues need to be considered. The first issue is to consider what enduring understandings are required. Teachers will understand that technology can improve both teaching and learning. In addition, teachers will understand the importance of technology integration in the classroom. The second issue is to review what the overarching "essential" questions are such as what do you know about the importance of technology in the 21st century and "how can technology affect the efficiency of school personnel". The next issue is to look at what teachers understand as a result of this unit will. The purposes are that teachers will understand how to use the Internet to search, to use e-mail, to use AOL Instant Messenger and to design a class and/or personal web page. Teachers will understand how to use Microsoft Office applications (Word, PowerPoint, and Excel) to increase efficiency of classroom organizational tasks. Teachers will understand the importance of technology integration in the classroom to improve teaching and learning. The fourth issue is to consider what "essential" and "unique" questions will focus this unit. Some samples are (1) What is the Internet? (2) How can the Internet be a useful classroom tool? (3) How can Microsoft Office applications be useful to teachers? and (4) What does current educational research say about the integration of technology in the classroom? The last issue is, "What evidence will show that students understand technology integration?"

IV. Motivating teachers with activities

This activity will allow teachers to start thinking about technology integration. Though they may be aware of technology, some teachers are not aware of the benefits of technology integration. Teachers will read the article and discuss it in small groups. The article will be used to facilitate a large group discussion of technology integration.

The fist procedure is to distribute copies of the article "Computers, Creativity, and the Curriculum: The Challenge for Schools, Literacy, and Learning" (Sefton-Green, 2001). Then the participants will read the article. While reading the article, the teachers will note uses for technology in the classroom as well as barriers of technology use in the classroom. In groups of 3 to 5, the teacher will discuss their thoughts. Each group will share their thinking in a brief oral presentation. Based on the comments of the groups, a large group discussion will be facilitated. The following topics for discussion are: (1)Why do you think technology can be scary? (2) Why do teachers integrate technology?" (3) Why do teachers not integrate technology? (4) What could be done to make teachers more likely to integrate technology? (5) What differences do you see in the amounts of technology present in various school districts? and (6) How and why do I integrate technology in the classroom? Finally, the teachers will write reflectively according to the following prompt. The teachers will understand the goal of the workshop through reading and discussion and begin to think about the role of technology in the classroom.

The materials will be copies of the article, writing prompt. The instructor will read the reflection of each teacher and will be looking for positive and negative aspects of current technology integration, or lackthereof. In addition, follow-up will occur on an individual and large group basis. The follow-up will depend on changes in thinking from the first day writing prompt to the mid-unit writing prompt.

Conclusion

It was created to prepare teachers to use technology in the classroom. In order for this unit to be successful, each participant will need access to a computer, the Internet, Netscape, Microsoft Office, and a printer. The goal of the unit is to give teachers an understanding of technology uses and applications that will benefit instruction and organization in the classroom. Also, teachers will understand the importance of technology integration. Any instructor using this unit must be highly skilled in technology use. The developers recommend that a district Technology Coordinator be the instructor for this unit. Additionally, the instructor should show knowledge of current educational research concerning technology integration.

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DIGITAL TECHNOLOGIES AND CULTURES

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Abstract: As part of our Liberal Studies Program at Millsaps College, which serves our entering students, I have designed and implemented a "Thematic" LS Section entitled "Digital Technologies and Cultures". This session describes the planning, implementation, and evaluation of this course.

Introduction

LS1000 employs a variety of analytical styles to examine the disciplines that comprise a liberal arts education at Millsaps. The shared experience of being introduced to the humanities, the sciences, and business leadership provides Millsaps students with both a unifying theme in their crucial first year and with the special skills they will need during their college years and beyond. The goals of the course are to teach particular competencies in critical thinking and communication and to instill an appreciation for an interdisciplinary view of lifelong learning and development.

The Course

The four units of LS1000 introduce you to several primary aspects of a liberal arts education:
Unit I: Growing in self-knowledge (Identity).
Unit II: Becoming aware of how you think when searching for the truth about something and learning to think more powerfully (Cognition).
Unit III: Learning to identify and weigh the factors involved in reaching a responsible decision in the most aware and informed way (Responsibility).
Unit IV: Presenting your work in the public community of thought and learning to assess your own thinking according to appropriate standards (Assessment).
Within the course, students write 3 Formal Essays and 2 Informal Essays (in-class).

This thematic version of LS1000 focuses on the impact of digital computing technology upon the humanities, the sciences, and business. Issues addressed will include creativity and technology ("CyberTheater", "IATH"), the effect of computers on society ("CyberCulture", the "Visual Culture", "The Technological Underclass", "Ivan Illich") , Privacy and Censorship on the Internet ("Digital Privacy", the "Electronic Frontier Foundation"), moral implications of copyright laws ("The Digital Millennium Copyright Act"), ethical uses of Internet resources ("CyberEthics" and the "Hacker Ethic"), progress in medicine with computers ("TeleMedicine", "CyberMedicine"), impact of computing technology on the global economy ("TeleCommunications", "E-Commerce"), and addictive behaviors fostered by computer technology ("Internet Addiction Disorder").

Materials

The reading materials for the course are taken exclusively from the Worldwide Web. The class meetings consist of discussions on the readings, as well as "training sessions" with technology. For more information, see the web page for the course at: http://www.millsaps.edu/~pursejm/ls18.htm

Conclusions

Student evaluations of the course have been very positive. The course has helped to spawn a project within the

Associated Colleges of the South (ACS) entitled "Digital Technologies and Cultures". For more information see: http://www.colleges.org/~dtc/

The IT Fundamentals Curriculum - Online Interactive Technology Skills Modules

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In the face of an increasing need for improved technology skills for workers in the United States, The e-Learning Network has created the Informational Technology Fundamentals (ITF) Curriculum. The ITF Curriculum consists of highly interactive online modules, designed to represent real-world scenarios encountered by users of technology. These modules cover subjects such as Setting Up a Computer, Number Systems, Electricity and Safety, Networking basics, advanced Networking, Hard Drives, Device Cards, Peripherals, and Operating Systems.

Each module provides an interactive learning experience, which include animated demonstrations, virtual lab simulations, and video clips. The modules involve frequent user interactions, including drag-and-drop and keyboarding. Since the modules are online 24 hours a day, they truly encompass the meaning of "Anytime, Anywhere" learning. Using a "Reusable Learning Objects" approach, these modules can be utilized in any order, within a curriculum or by an individual wishing to improve his or her technology skills.

As an example, our Setting Up the Computer module teaches the user about the different cables and cords used to set up a computer. The module has original graphics and Flash animations that show close-up views of cable connectors and the ports into which the connectors plug on a computer. It has an interactive assessment with several scenarios of different real-world skill levels. The objective of this module is for learners to be able to completely set up a computer after using the module.

The e-Learning Network is part of the Technology Based Learning & Research department in the College of Education at Arizona State University, and has Cisco Systems as a major partner in development of the modules. The project is partially funded through a grant from the Fund for the Improvement of Post Secondary Education (FIPSE). As such, the ITF modules are available to the general public, free of charge. While not a primary project goal, we hope to improve the basic technology skills of pre- and in-service teachers to enable them to progress towards full integration of technology in their classrooms.

Objectives of the Session:

- Introduce the Informational Technology Fundamentals modules to teacher education and professional development audience
- Give participants methods for using the Informational Technology Fundamentals modules in their teacher education and professional development efforts
- Give participants methods for using the Informational Technology Fundamentals modules in their technology courses with higher-grade students
- Increase usage of the Informational Technology Fundamentals modules

The purpose of this session is to introduce participants to the Informational Technology Fundamental modules and discuss how teacher educators can utilize the modules in teacher education and professional development. Some of the modules can be used to give pre-service and in-service teachers an introduction to basic computer workings as a precursor to learning about technology integration. While organizations such as the National Council for Accreditation of Teacher Education (NCATE) have embedded their commitment to technology into their teacher education standards, others have noted that in general teacher preparation programs do not spend enough time teaching pre-service teachers about computing itself (Duran, 2001). Teachers who are not comfortable with the technology will not venture into attempting integration of technology into their curriculum.

The Apple Classrooms of Tomorrow (ACOT) studies revealed that teachers progress through stages as they learn how to integrate technology into their classrooms. The first two stages are the "Entry" stage, where teachers learn the basics of using computers, and the "Adoption" stage, where teachers begin to use

technology as a support for traditional instruction. Often, teacher education and professional development programs skip the "Entry" stage and leap right into the "Adoption" stage, without giving participants a chance to learn informational technology and computing basics. These modules can be used for pre- and in-service teachers who are in the "Entry" stage, and approaching the "Adoption" stage of technology skill acquisition (Apple, 1995).

The ITF modules are also valuable for pre- and in-service teachers who will be teaching technology courses to students, or who are involved in programs like the Cisco Networking Academies. The modules can be used by teachers to learn the technology content and also with higher-grade students who are learning technology subjects. They can also be used as preparation for various technology certifications, such as A+, Net+, and Cisco Certified Network Administrator.

Audience

This session will be of interest to teacher educators who need an interactive and flexible method for teaching pre- and in-service teachers basic computer and technology skills. Actual pre- and in-service teachers may also be interested in using the modules on their own, since they can be accessed anytime through the Internet. Participants should have experience with keyboarding and using a mouse, as well as basic experience in using a web browser. Most interactions involve using the mouse to drag and drop, or click hyper-linked buttons. There are no prerequisites for this session.

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The Establishment of Basic Computer Literacy

> Do not confine your children to your own learning for they were born in another time. (Hebrew Proverb)

In June of 1999, the Joint Economic Committee met to discuss advances in technology at the High Summit on Technology. These proceedings included a panel of individuals from all areas of the technological industry. The event incorporated high school and college students, via teleconferencing, who questioned members of the Joint Economic Committee and members of the primary panel. One of the chief concerns for the members of the panel, according to Michael Durham (1999), included increasing the number of technologically literate workers. Bill Gates (1999) charged the school systems with this responsibility. The Secretary of Education, Richard Riley (1999) agreed but stated that there must be available government funding in order for the schools to maintain sufficient levels of technology training. Seymour Papert (1998) explained that the culture of children today was so radically different from twenty years ago. Gates (1998) agreed and advised educators not to be afraid of change but rather embrace it and let technology make the classroom for this new student culture a more habitable environment. Don Tapscott (1998) had the same opinion and labeled this new culture the Net Generation.

The purpose of this study was to establish a basic computer literacy proficiency exam for students entering university. Based on the Technology Counts 1999 (1999) report, it was believed that students were already exposed to basic computer literacy courses prior to entering higher education. The Tennessee State Department of Education (2000), through the vocational technical division, offered a technology path that included courses in the application of technology although computer courses were not general

education graduation requirements.

Designing a proficiency exam for students entering a university enabled students already familiar with technology the option of exempting basic computer literacy computer courses or enrolling in computer courses comparable with their level of skill. The participants of this study were declared education majors enrolled in initial teacher education courses. This study examined the computer literacy of these students as well as argued that students should be able to test out of required basic computer courses in university if basic computer literacy skills are present. Testing out of courses enable students who have already mastered the objectives of the course to progress on to more challenging coursework. The study also compared students by year of graduation to determine if most recent graduates maintained proficient computer literacy compared to others. The hypotheses stated that students graduating in the past five years would have an increased opportunity to master computer skills compared to students graduating more than five years ago. The results of the study surprisingly did not support the hypotheses. The following questions were proposed at the onset of this study:

1. Is there a difference between the curriculum objectives required by the state in secondary education and the course requirements for basic computer literacy courses offered at Middle Tennessee State University?
2. Is there a need for a placement test of basic computer literacy at universities?
3. Is there a need for students to test out of the required basic computer literacy course at universities?

Because all of the participants were education majors, a comparison of education versus non-education major was not possible. However, this was included in further study as well as to investigate whether teachers of computer classes in high school should obtain certification in computer science. The study also found that computer courses should be required for all students as a graduation requirement.

This was an exceptional study and resulted in a fundamental web based format for testing overall basic computer literacy rather than specific computer applications. As a result of this study it was determined that pre-service teachers should be tested on their overall basic computer literacy as well as participate in courses to enhance established computer skills in an effort to be well prepared to lead a twenty-first century classroom.

Computer Science as a Discipline in Germany: the Perspective of the Professors

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The professionalisation of Computer Science in Germany is still on its way, that means: It doesn't exist a generally accepted basis, recognised in the changing and diversified nature of the field. The lack of delimited fields of competence in the discipline, especially in software development also reflects this tendency.

Engineering, Mathematics and interdisciplinary orientations contribute to outline and define Computer Science and particularly the Software Development as its most prominent professional praxis. The analysis of self-definitions of the discipline and the praxis of Software Development will be used for examining the process of professionalisation of Computer Science and hence for eliciting the participation-chances of women, who are underrepresented in this field.

In this paper we will focus on the development of computer science as a discipline in Germany and how it is considered from the perspective of professors who represent different paradigms inside the discipline.

Peter Denning defines the computer profession as "the people and institutions that have been created to take care of other people's concerns in information processing and co-ordination through world-wide communication systems. (...) The discipline of computer science is the body of knowledge and practices used by computing professionals in their work.(...)" (Denning, P. 1998, p.1). Computing experts gain this body of knowledge and practices in the educational field and in the praxis. The process, through which the academic area and the praxis transfer their knowledge to each other and the integration of new knowledge in both fields takes place in two different levels: an intellectual one as well as in an institutional one. The representants of the discipline in teaching and research constitute the intellectual level of the professionalisation- process of computer science, while the set of associations representing the interests of the computer experts working in the praxis shape the institutional level. The struggle for power in the discipline in order to establish its orientation takes place principally in the intellectual level of the professionalisation-process.

While the institutional level of computer science is rather stable in Germany, in the intellectual level there is not an assent about the core-knowledge of the discipline and the delimitation and definitions of the relevant domains for the professional praxis. In this level we can distinguish three knowledge paradigms (Coy 1998):

- Mathematical-formal. In this paradigm logical representations as well as verification and complexity problems represent the most important measure basis for quality. A mathematical-logical educational basis is for this paradigm the most important source of expertise (Dijkstra 1989). Social responsability is seen as a question of computer programs' security and certainty (Peschek 1996). Interdisciplinarity is not well considered in this paradigm that is oriented to the delimitation of the discipline through its mathematical-logical carachter.
- Engineering. The focus of this paradigm is in the technical aspects of computer science. Methods of engineering must be combined with the optimisation of time and costs to secure optimal Software-products. Technical application and configuration of technique are considered as secondary aspects in the discipline (Broy & Schmidt 1999).
- Social-critical. In this paradigm social responsability is considered as an important aspect to be integrated in the curricula of computer science. Usability and the adequacy of computer solutions for persons as well as the consideration of computers as a tool and not at as an objective are the main characteristics of this paradigm (Keil-Slawik 1996; Floyd 1985). Interdiscipinarity is considered in this paradigm as a very important factor for the development of computer science curricula, risking the delimitation of the discipline from other competing disciplines in the IT-field (Engineering, Electronic, etc.).

These paradigms are in a constant struggle in the intellectual level of computer science to establish the orientation of the discipline. Nevertheless the three paradigms are not present in the computer science in this form, but in a mix-form with different weights in tertiary institutions.

In our study we want to analyse which of these paradigms are more present in the orientation of the discipline in the educational field as well as in the praxis of software development. Which are the main skills that professional computer specialist must gain through their educational trajectory? What role does the mathematical basis play in the development of the discipline? What is the importance of social aspects for the development of computer science curricula? How should be established the knowledge transfer between computer science education and the professional praxis? How should be organised the continuing education in computer science by the educational institutions? What role should play soft skills in computer science education? What are the

main deficits of computer science specialists and how could they be solved? What role does interdisciplinarity play in the development of computer science?

These are some of the questions we want to answer in our survey considering the perspective of three relevant groups in computer science: Professors in universities and research institutions; Software Developers; and Personal Managers in Software enterprises. In this paper we will focus on the point of view of professors in universities and research institutions.

1. Methodology

A qualitative methodology has been used to analyse the professionalisation process of Computer Science: Open interviews have been used to elucidate the inner models and the self-definitions of the field as a science and as a profession in several industrial sectors. We have considered the point of view of three representative groups in computer science:

- Intellectual (Representatives of tertiary education and research institutions of Computer Science; N=6),
- *Industry/Software Development* (Software Developers in software companies in Germany; N=30),
- *Industry/Human Resources development* (Personal Manager in software companies in Germany; N=12).

The interviews have been conducted during 2000 and 2001.

2. Analysis

After the transcription of the interviews we have conducted an analysis for each group and in a further step we conducted an analysis of the three groups together comparing the different perspectives of each one of them.

3. Some results of the group of professors in tertiary education and research institutions

Computer Science is considered as an apply discipline and there fore it is very important from the point of view of the professors to include the knowledge of other disciplines into computer science. Nevertheless computer science is caractherised as a technological field that should use engineering methods.

The recognition of structures for modelling practices is very relevant in computer science and must be trained during the educational trajectory of computer science specialists. Mathematics play in this sense a basic role, since it helps to acquire this kind of structural thinking. Nevertheless, computer specialists must be always willing to gain and apply new knowledge. From the point of view of the professors this is a basic competence that computer specialists must have to survive in the praxis.

There is not a clear assent among the professors in relation to the three mentioned paradigms. Nevertheless, the importance of interdisciplinarity and the relevance of soft skills for the professional praxis is supported by all of them. Specially these skills are consideredas the main deficit of computer specialists.

Technology Skills Certificate: A Web-based Student Demonstration of Basic Technology Skills.

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Technology plays an important role in facilitating teaching and learning and many teacher preparation programs have made a commitment to prepare graduates to utilize it effectively. An essential element in this process is the identification of methods that allow both students and colleges to demonstrate that prospective teachers have indeed mastered the necessary knowledge and skills. One approach utilized at the University of Nebraska-Lincoln has been the creation of a Web-based technology skills certification course. The course has evolved over a three year period and has been offered to over 250 students. This session will describe and demonstrate the development, content, delivery, and management strategies utilized in the course.

Approach/Design Issues

Several factors were considered during the design of the course:

(1) The Web site uses a project-based approach to demonstrate competencies. The emphasis is on the products that teachers create rather than a specific strategy or step-by-step approach to learning a skill. Students use the tools at their disposal to complete the projects. The projects are designed to relate to tasks that teachers perform rather that specific equipment or software.

(2) Emphasis is on both fluency with software and hardware and the integration of technology in both teaching and learning. In addition, social, ethical and professional issues are addressed.

(3) The technology available to teachers changes continuously as new tools and new ways of applying them are developed. The ability to teach themselves how to use new software and hardware is more important than the specific steps in using one particular piece of software. Resources are provided in each module as a starting place but the emphasis is on activities that encourage the use of available tools for learning the technology. These include built-in help, manuals, and Web-resources. They may also include others with technology expertise, including other members of the class.

(4) Teachers College operates under a Scholar-Practictioner Model. The class represents our efforts to learn how to use the Web to teach. We are attempting be innovative while seeking to improve. We ask for feedback on both learning and on the strategies and approaches that are being implemented and we are developing systems that allow us to continuously improve the resources and activities of the course.

Course Content

Participants must complete a series of nine modules designed to develop skills and demonstrate competencies related to the National Educational Technology Standards (NETS) adopted by the International Society for Technology in Education (ISTE). Each module contains an overview of the module, requirements for completing the module, a mastery project, and a set of resources and support for completing the project, and a reflection on the module activities. Modules are created around the following topics:

(1) Basic Computer Operations and Communication Tools
(2) Basic Productivity Tools
(3) Integrating Basic Productivity Tools in Instruction
(4) Instructional Support Tools – Multimedia and Instruction
(5) Integrating Instructional Software and Learning Tools
(6) Application of Telecommunication Tools in Teaching
(7) Technology and Assessment
(8) Social, Ethical and Human Issues
(9) Technology for Professional Growth

The session will highlight and demonstrate sample components and mastery projects from the modules.

Management Issues

Because the course is Web-based it has allowed us the opportunity to design strategies for tracking student progress, displaying student work in ways that are convenient for the instructor and the student, and providing students relevant feedback on their work. We are currently investigating strategies for implementing self, peer and instructor feedback relative to student work on the mastery projects.

A New Model for Pre-Service Educational Technology Classes

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Abstract:

EDLF 345, the required course in educational technology at the Curry School of Education, is being restructured by its instructors in recognition of the fact that technology can not be used or taught out of a larger context. In the case of this class, the context is the set of methods and content-area courses that education school students must complete. Changes being made to the course include the modeling of technology-driven lessons specific to certain content areas, the requiring of student-developed projects and plans that demonstrate both technological and pedagogical proficiency, and the development of partnerships with other school of education faculty members to include considerations of technology and teaching methods in classes other than just the technology course.

As the integration of technology into K12 classrooms becomes a standards-driven requirement across the country, teacher education programs are struggling to design courses that prepare educators to successfully incorporate computers into their classrooms. The successful pre-service educational technology class can no longer be just a training course on software use; rather, it must be a methods course that seeks to model appropriate technology use across content areas. The class, like the technology it teaches, cannot exist by itself; instead, it must be part of a larger and more meaningful context. The class must be made into a tight-fitting component of the teacher education program in which it is offered. Such a goal can only be met by changing both the technology class (it must incorporate other curricular content such as learning theories) and other methods classes (which must refer to technology use when discussing content and pedagogy). This paper describes the attempt at the University of Virginia's Curry School of Education to make such changes to EDLF 345, the required undergraduate educational technology course. Although the discussion here is limited to this one course, there are important reasons behind the changes – and consequences of them – that can be useful to any college or university with a teacher education program that wishes to appropriately offer technology courses to its students.

The restructuring of EDLF 345 ("introduction to educational technology") began with the conceptual idea that technology use in the classroom is meaningful only when the technology aims to enhance teaching or learning. Although obvious, this goal is not always the driving force behind technology and computer use in K-12 schools. At times, the pupil-to-computer ratio, the average student computer use time, or the notion of a "computer in every classroom" supercedes any real educational purposes. Because the actuality of appropriate technology use differs among the various content areas, EDLF 345 was divided into separate course sections representing these areas; there is at least one section per semester apiece for students concentrating in math and science, secondary humanities, and elementary education. Language, health and physical education majors typically enroll in one of the two latter sections and have course content modified for their particular foci. This division of content allows instructors of EDLF 345 to better differentiate the software and technology used, to decide how it is best used, as well as to model lessons that are unique to each content area.

It is this feature of the class – the teaching of appropriate technology-enhanced lessons – that is at the heart of EDLF 345. Less time is spent in class teaching the tool and more time is devoted to teaching *with* the tool – that is, modeling lessons that make appropriate use of technology. During each meeting of EDLF 345, students are

introduced to a new tool or technology via their participation in a lesson that teaches content using that tool. These lessons may be developed in conjunction with content-area faculty. Students in the secondary humanities section, for instance, may learn about the effects of a region's geography and location on its seasonal temperatures through the use of the graphing features in a spreadsheet application. Instead of focusing solely on the skills involved in using such a program, students use the program to better visualize and interpreting data. They are therefore allowed to reinforce (and, in some cases, to learn) subject matter in their content areas, to see an example of a suitable lesson using technology, and still learn how to use the tool as well – the last quarter- to half-hour of each class is dedicated to an introduction to the current tool for those students who wish to remain; students are also expected to work through tutorials outside of class time.

By focusing on the content and participating in model lessons, students in EDLF 345 are perhaps better prepared for their own efforts as future teachers to enhance learning and teaching with technology. This approach also appears to have the added benefit of removing at least some of the anxiety students seem to have when approaching computer use. With the focus squarely on methods and content, and with the role of technology altered to a supporting one, many students are put more at ease in EDLF 345 than they might otherwise be in another technology class. They may also become more motivated to learn the tools when they see how those tools can immediately benefit their students and classrooms.

Another important consideration in the restructuring of EDLF 345 is the idea that students need to be taught how to be critical users of technology; the successful teacher also knows when *not* to use computers. To that end, students enrolled in EDLF 345 are asked to read various articles concerning the use of technology in the K-12 classroom. Some articles, such as a series from the *Washington Post Magazine* in September 2001, extol the use of computers in education and highlight exemplary teachers and lessons; others, such as Todd Oppenheimer's *The Computer Delusion*, are far more critical of technology use. After reading the articles, students write brief reactions to the readings, post these reactions to their web sites, and use them to begin class discussions on the benefits and disadvantages of K-12 educational technology. These discussions are held at the expense of class time, but often provide participants with new viewpoints and ideas. Students sometimes choose to revisit their initial reflections after the discussions.

With these foundations in place for a thoughtful and critical approach to technology use, EDLF 345 is designed to expose students to a wide variety of tools and methods of teaching with them, as well as the chance to explore a few of those tools in greater detail. This 'breadth and depth' perspective is accomplished in several ways. First, students are required to demonstrate their competency at a basic level on all technology used in the class. Each week, they create and turn in (by posting to their personal web sites) samples of the types of educational products that can be developed with each tool as well as a rough sketch of a lesson plan involving the tool and product. These assignments tie in nicely to students' current methods classes, which are often concurrently teaching students how to develop lesson plans in general. Elementary education students learning how to teach with database programs would be expected to create a database-enhanced lesson that they as future teachers might employ, as well as an example of the type of database their students would use of create as a result of the lesson. Such competencies provide practice for the students and allow instructors to gauge individual and class abilities. Second, in addition to their basic competencies, EDLF 345 students are required to develop a large semester project that incorporates one or more of the technologies they have used. This project may take the form of a fully-developed lesson or unit plan that teaches content in their specific areas of concentration, or it may be a technology-enhanced extension of a project for another methods course in which they are enrolled. In any form, it is designed to allow students to explore the tools that they have found most useful or interesting. As with all other work, these projects (when possible) are posted to students' web sites.

Another important component of EDLF 345 is the creation by students of a web-based technology portfolio that showcases not only their technical proficiencies but also demonstrates critical thought about the use of technology. This portfolio, due at the end of the semester, consists primarily of students' work to date for the class. Little extra effort is required for this part of the portfolio as all assignments are turned in via the web; students are merely asked to write a brief description of each competency that they include. Additional pieces of the portfolio, which students generate at the end of their time in the class, include a "technology autobiography" which describes students' experience with, and attitudes towards, technology in general and educational technology in particular; a reflection piece on a chosen learning theory focusing on its application to educational technology; and any additional work that a student has developed that includes technology (e.g., a presentation for

another class). This portfolio, once in place, can be updated after a student completes EDLF 345 and can eventually be used when a graduate is seeking employment.

A final feature of EDLF 345 is its place among other education school classes. To create a relationship between the technology class and these courses, several components of EDLF 345 ask students to make connections between content in those classes and the tools being used in their technology course. In the example noted above, students are asked to consider, with specific regard to technology use, the various theories of human learning to which they are being exposed in another course. A student might, for example, choose to discuss how the use of multimedia presentation software can be made to fit with Howard Gardner's theory of multiple intelligences, or how "skill-and-drill" software is an extension of behaviorist concepts of learning. This component of the course serves to reinforce content from other education classes as well as to extend that content to a practical and useful end. Additional ties between EDLF 345 and other courses can be seen in the content-driven lessons that students develop and their incorporation of sound pedagogical and classroom management techniques into those lessons.

The description above focuses on the changes made to the technology class itself, but this is only half of the effort being made in the Curry School. These changes are the result of a dialogue that is taking place among instructors which seeks to 'cross-promote' technology use and teaching methods. Ultimately, technology classes must consider pedagogy – how to teach with the tools, and pedagogy classes must refer to technology – how to use the tools when teaching. This is a long-term process and can only be successful if all stakeholders are involved *and* see the importance of making the changes. To start the process, instructors of EDLF 345 met with content-area and methods faculty to describe the goal of altering the technology class to emphasize the relationship between educational technology and certain curricular components of the other instructors' own courses. With the first changes only affecting EDLF 345, the process required methods and content-area faculty to act in an advisory capacity (e.g., providing a standard lesson plan template for students to follow when developing their competencies) rather than restructuring their own syllabi as well. There was an enthusiastic response to this initiative, with faculty supplying their notes and texts to EDLF 345 instructors and volunteering to review the lessons being used as models.

These first steps were followed up with the joint development, by a technology instructor and a content-area instructor, of one such lesson. Each person acted as an expert for his or her particular field, and the lesson that resulted served as the prototype for the creation of a rubric that allows instructors to evaluate student-generated lesson plans for the appropriateness of technology use in those lessons. This rubric can be used by both instructors in their respective courses. Ultimately, exemplary lessons will be collected and posted to a web site. These lessons may serve as future model lessons to be included in EDLF 345, and will certainly be used as references for students enrolled in the course.

These changes mark the beginning of what will hopefully be a lasting and fruitful partnership between technology instructors and other education school faculty. Although the results to date have been promising, there is still much work to be done before the course can be said to fulfill the goals of its instructors. Although untested, future plans may serve to provide a clearer picture of those goals and will be briefly discussed here. Further changes within the technology course itself include requiring students to join the International Society of Computers in Education (ISTE) in lieu of purchasing a textbook (and at approximately the same price as a book). ISTE membership will allow students to receive a subscription to *Leading and Learning with Technology*, whose articles may provide new ideas concerning technology use and will serve to illustrate the feasibility and benefits of implementing technology-enhanced lessons in the K-12 classroom. Membership in a professional organization will also benefit students when they embark upon a job search after graduation. Other plans include having students develop lesson plans in groups, and perhaps team-teaching one of their completed lessons to the class towards the end of the semester; participating in real-time and asynchronous discussion forums to experience various systems for possible use in their own classrooms; and working with content-area graduate students to collaborative develop lesson plans. Changes to methods and content-area courses are also being considered, including the incorporation of the technology-enhanced lesson rubric described earlier; the collaborative development of additional technology-based lessons; and the incorporation of technology issues when discussing classroom management and pedagogical issues.

This paper has described the changes to EDLF 345, the required technology course at the Curry School of Education. Although these changes are specific to that class, the idea behind them can be applied to any such course in a college or university school of education. The driving force behind the restructuring of the class is the

idea that a course in educational technology, like the technology it seeks to teach, must be considered within context. In the case of EDLF 345, efforts are being made to tie the content of the class to the content of methods and content-area courses – which, if successful, will strengthen students' experiences with all classes.

Can Standards be Met and Evaluated Through an Online Teacher Education Technology Course? A Case Study

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Abstract: The continual evolution of the national technology standards creates a continual state of flux within the world of instructional technology. However, this creative online environment offers the possibilities that may not be available within other specialization areas; namely, the opportunity to reinvent conceptual frameworks of understanding and creative endeavors. Innovative teacher education units across the United States of America are reaching for opportunities to maintain the bleeding edge of understanding and integrating technology in successful and appropriate manners, which may also lead to thoughtful reflection as to the state and reasoning behind "why we do what we do".

Introduction

Web-basing coursework has been a major focus of universities around the world for the past five- to ten-year period and has resulted in a bell-curve fallout of subject-specific quality coursework. However, the teacher education units have more carefully begun to review the positive and negative aspects associated with the possibilities of Web-basing teacher education coursework. Can standards be met through Web-based teacher education coursework? Can standards be evaluated through Web-based teacher education coursework? The simplistic answer to such questions is, "Yes!" Standards can be met and evaluated through Web-based teacher education coursework.

Since Vannevar Bush (1945) first imagined an intelligent machine that could maintain the full knowledge of the world, man has been steadily moving towards the realization of the Information Age. With the rise of and open access to the World Wide Web since the early 1990s, insurmountable efforts towards communication and knowledge dispersal has been realized. As early as 1980, Seymour Papert envisioned a computer interface that would offer access to learning environments.

> I believe that the computer presence will enable us to so modify the learning environment outside the classrooms that much if not all the knowledge schools presently try to teach with such pain and expense and such limited success will be learned, as the child learns to talk, painlessly, successfully, and without organized instruction. (Papert, 1980, p. 9)

With prophesies such as Papert's, the dawning of the Information Age, with the creation of numerous possibilities, has become a reality. However, the importance of learning environments, instructional design, learning environments and superior facilitators has become an area of utmost importance to the success of Bush's and Papert's visions. After all, "Computers are not an end in themselves. The goal of technology integration into the classroom and curriculum is not to expose students to computers and the Internet. Technology, by definition, is a tool" (Dockterman, 1998, p. 21). With such a tool in the hands of exceptional, creative persons, the ability to create learning opportunities has become a reality. Web-based courses are on the rise, with research results creating an intelligent conversation concerning both positive aspects and areas for improvement to the Web-based learning environments available today.

Cognitive Flexibility

Cognitive flexibility creates a theoretical view through which to create a conceptual understanding of the learning environment. The nature of learning is often environed within complex and ill-structured opportunities to obtain and understand knowledge. Spiro and Jeng state that, "By cognitive flexibility, we mean the ability to spontaneously restructure one's knowledge, in many ways, in adaptive response to radically changing situational demands.... This is a function of both the way knowledge is represented (e.g., along multiple rather single conceptual dimensions) and the processes that operate on those mental representations (e.g., processes of schema assembly rather than intact schema retrieval)" (1990, page 165). Additionally, one may note that cognitive flexibility "is largely concerned with transfer of knowledge and skills beyond their initial learning situation" (Kearsley, http://tip.psychology.org/spiro.html, paragraph 2). As such, cognitive flexibility is delineated towards a conceptual understanding of Web-based learning environments to support the integration and success of interactive technologies, such as a Web-based teacher education technology course.

Through this complex and ill-structured domain, the creation of a conceptual framework of understanding must arise for each learner. This is where the instructional design element is of utmost importance. Only through the careful creation of a learning environment, with all activities created and implemented appropriately and successfully, will the learner's understanding of the information become successfully integrated into the learner's conceptual framework.

Instructional Design

The instructional design process offers the standardization of materials to each of the teacher education courses; therefore, the consideration of adjunct faculty dismissing imperative knowledge and activities is no longer a consideration due to the standardization of the Web-based courses that have been designed over an extended period of time by faculty with numerous years of experience associated with the subject matter.

National Standards Integration into Web-based Coursework

As stated by the International Society for Technology in Education (ISTE), "Technology must become an integral part of the teaching and learning process in every setting supporting the preparation of teachers" (International Society for Technology in Education, 2001, paragraph 2). Further, "A combination of essential conditions is required for teachers to create learning environments conducive to powerful uses of technology. The most effective learning environments meld traditional approaches and new approaches to facilitate learning of relevant content while addressing individual needs" (International Society for Technology in Education, 2001, paragraph 1). Therefore, ISTE is one of the leading international associations that support the integration of technology into the learning environments. Taking such integration of technology a step further the learning environment may be mediated by the technology, as in the world of the Web-based course environment.

Specifically, the teacher education technology course offers the opportunity to focus upon ISTE standards for both the teachers (ISTE National Educational Technology Standards for Teachers, also referred to as NETS*T) and the learners (ISTE National Educational Technology Standards for Students, also referred to as NETS*S) so as to emulate the importance of both ISTE standards. NETS*T offers 23 indicators which are organized into six umbrella categories:

I. Technology Operations and Concepts;
II. Planning and Designing Learning Environments and Experiences;
III. Teaching, Learning, and Curriculum;
IV. Assessment and Evaluation;
V. Productivity and Professional Practice; and,

VI. Social, Ethical, Legal, and Human Issues.
(International Society for Technology in Education, 2000, paragraph 6)

Standards Evaluation

An important aspect to any educational endeavor is the evaluation of the learning objectives. More clearly delineated, an assessment of the assignment(s) that exemplify the learner's grasp of the learning objectives for the unit of study. As numerous forms of assessment are appropriate and successful within a learning environment, following are the assessment formats currently integrated into the Web-based teacher education technology course. Each of these aspects are integrated into each unit of study within the course.

- Knowledge-based quizzes;
- Project-based assignments and products, with assessment rubrics available for review; and,
- Reflective journals.

For purposes of this course, there is also a capstone project that each learner must successfully design, develop, formatively and summatively evaluate. As well, a full project expectation description and an assessment rubric is available to the learner for purposes of guidance and self-assessment.

Web-based Teacher Education Technology Course

The Web-based teacher education technology course has been developed through which to exemplify and designate the ISTE NETS*T (International Society for Technology in Education, 2000) standards. As such, the following units of study have been integrated into the course:

- Internet
- Copyright/Ethics/Equity/Legal
- Hardware/Software/Networking Tools
- Software Tools/Emerging Technologies
- Software Evaluation
- Learning Theory/Assistive Technology
- Storyboarding/Project Management/Assessment
- Web Design
- Graphics
- Video/Audio/CD-Rom
- Word Processing/Desktop Publishing
- Spreadsheets
- Databases
- Presentations

Within each of the units, the following instructional design elements are implemented for purposes of flow and to develop a comfort level within the learner's conceptual framework of understanding:

- Objective
- Instructional Events
    - Readings
    - Best practice examples
    - Guided practice/tutorial
- Product Creation
- Peer Evaluation
- Discussion
    - Bulletin board
    - Chat room
- Reflection
    - Synthesis of skills and knowledge gained
    - Application of skills and knowledge gained in a learning environment

As may be concluded from the above Web-based teacher education technology course scope and sequence, the expectations for each learner to successfully complete the course are significant. As such, the teacher candidates maintain a level of technological understanding at both the theoretical and practical levels as they progress towards methods coursework within their specialization areas.

Conclusion

The continual evolution of the national technology standards creates a continual state of flux within the world of instructional technology. However, this creative environment offers the possibilities that may not be available within other specialization areas; namely, the opportunity to reinvent conceptual frameworks of understanding and creative endeavors. "The most obvious benefit of the electronic classroom is that it achieves what progressive educators could only dream of: a union of work and play.... There is no certainty that the electronic classroom will actually fulfill this promise, but it is this hope that makes the realization so attractive" (Ravitch, 1987, p. 28). Innovative teacher education units across the United States of America are reaching for opportunities to maintain the bleeding edge of understanding and integrating technology in successful and appropriate manners, which may also lead to thoughtful reflection as to the state and reasoning behind "why we do what we do".

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Training Teachers to Integrate Technology into the Classroom Curriculum: Online versus Face-to-Face Course Delivery

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Abstract: The purpose of this study was to determine to what extent teachers (a) alter their teaching methods and (b) integrate technology into their classroom curriculum during, and after a technology training course designed to prepare teachers to use technologies that support their teaching and student learning. Case study methods (Wiersma, 1995) were applied to gain understanding of teachers' experiences as they moved through an online (OL) or face-to-face (F2F) course designed to prepare teachers for integrating technology into the curriculum. Complementary data collection processes (Shulman, 1986) were used in eight cases to provide depth and breadth towards identifying and analyzing barriers and processes affecting the impact of the training course. Recommendations from this study contribute to the future development of an effective model of teacher training in technology integration for different types of teachers.

Introduction

Teachers must be comfortable with technology tools, be prepared to integrate technology effectively into the classroom curriculum, and be able to incorporate the new teaching methods enabled by technology (CEO Forum, 2000; U.S. Department of Education, 2000). Teachers need experience with technical skills and knowledge if they are to develop a vision for technology integration within their own individualized environment. They need models of effective teaching practices that integrate technology. They need access to resources that promote or support technology integration in the curriculum. Educating teachers in the processes of integrating technology into the curriculum must replace current practice of simply training teachers in computer applications (Brownell, 1992; Ertmer, 1999; Roblyer, Ed wards, & Havriluk, 2000; Schrum, 1999; Simonson & Thompson, 1997).

In response to the challenge for preparing teachers to use technology and teach with it, campus technology teams, colleges, universities, and other organizations are focusing on technology training programs. Traditionally, teachers have been forced to attend courses at training facility or college campus to receive face-to-face (F2F) technology instruction, thus taking time away from their other duties. Many teachers are too busy in their work to participate in instruction outside of their own campus environment. Sharp (1996) reported that, "recently, higher education institutions have used distance education to reach a diverse audience that would not be accessible through ordinary traditional classroom instruction" (p. 277).

The innovation of Web-based instruction (WBI) brings courses to individuals and groups who might not otherwise have access to them (Brownell, 1992; Khan, 1997; Reeves & Reeves, 1997; Relan & Gillani, 1997). The effectiveness of training received in a traditional (F2F) classroom setting versus training delivered through distance learning is under constant debate. But as the Information Age evolves, our society is undergoing massive changes that impact our educational systems. Advances in information technology, coupled with the changes in society, are creating new paradigms for education. Teachers in these new educational paradigms require rich learning environments supported by well-designed resources (Reigeluth & Khan, 1994). While, the World Wide Web, as a medium of learning and instruction, has the

potential to support the creation of these well-designed resources, the traditional F2F classroom environment should not be discarded (Khan).

Web-based instruction (WBI) brings courses to individuals and groups who might not otherwise have access to them (Brownell, 1992; Khan, 1997; Reeves & Reeves, 1997; Relan & Gillani, 1997). The effectiveness of training received in a traditional (F2F) classroom setting versus training delivered through distance learning is under constant debate. Advances in information technology, coupled with the changes in society, are creating new paradigms for education. Teachers in these new educational paradigms require rich learning environments supported by well-designed resources (Reigeluth & Khan, 1994). The World Wide Web, as a medium of learning and instruction, has the potential to support the creation of these well-designed resources (Khan).

The Study

The purpose of this study was to determine to what extent teachers (a) alter their teaching methods and (b) integrate technology into their classroom curriculum during, and after a technology training course designed to prepare teachers to use technologies that support their teaching and student learning. The course under investigation was offered in both OL and F2F delivery formats. Therefore, comparison of the impact of both modes of instruction on teacher professional development within the subject area of technology training and implementation was conducted.

Case study methods (Wiersma, 1995) were applied to gain understanding of teachers' experiences as they moved through an online (OL) or face-to-face (F2F) course designed to prepare teachers for integrating technology into the curriculum. The cases illuminated the processes of technology integration for elementary and secondary teachers possessing low and high levels of technology skill and use. Complementary data collection processes (Shulman, 1986) were used in each of the eight cases to provide depth and breadth in identifying and analyzing the barriers and processes affecting the impact of the training course. In this study, the integration of survey, interview, and observational approaches offered the researcher an opportunity to develop a complete analysis of participant behavior from a holistic perspective (Gall, Borg & Gall, 1996).

INST 6031:Applications of Technology, a core graduate-level course offered by the School of Education at the University of Houston – Clear Lake, introduced students to the tools and skills necessary to understand and operate computers, navigate the Internet and World Wide Web, and create hypermedia products. The course included educational applications of instructional and information technologies to promote the integration of technology into the curriculum. Emphasis was on the comprehensive integration and implementation of the Technology Applications Texas Essential Knowledge and Skills (Texas Education Agency, 2001), Secretary's Commission on Achieving Necessary Skills (SCANS) 2000 report (U.S. Department of Labor), and those tools that have important implications for the creation of products with the technology. The course was offered either in an OL format or in a traditional F2F setting. The OL course met for an initial orientation session prior to the start of the semester and all other interaction was conducted on-line. The F2F course met weekly for 15 3-hour sessions. Within both delivery methods, a combination of hands-on lab assignments and content material was offered through a student-centered approach. Students and faculty worked together to identify learning requirements, learning strategies and assessment criteria based on students' prior skills and areas of interest. Students gained experience in the educational use of such technologies as productivity tools, presentation graphics, multimedia, and telecomputing technologies; however, they did so by applying tools to practical problems and opportunities as the basis for understanding, developing, and demonstrating activities that enhanced both student and teacher performance.

The PK-12 teachers enrolled in all sections of the graduate level *INST 6031:Applications of Technology* course at University of Houston – Clear Lake made up the pool of 30 participants. A Computer Use Survey was administered and collected prior to any classroom instruction. The survey scores were based on a point value associated with the level of skills selected by the individual, levels 1 - 4 were given point values of 1 - 4 accordingly, no response resulted in zero points for that question. The participants were divided into two groups, which were representative of the participants' teaching grade levels Elementary (PK-6) and Secondary (6-12). The Elementary and Secondary groups were then divided by course delivery method. The two course delivery methods under investigation were OL and F2F. Therefore, the cases for investigation were selected from a sample of Elementary – OL, Elementary – F2F, Secondary – OL and Secondary – F2F. A systematic sample using circular lists, rank ordered by skill level from

highest to lowest composite score, was used to ensure representation of varied technology skill levels within the grade levels. A sample size of 2 was chosen for each of the delivery methods within each of the grade levels, resulting in a total of 8 participants.

Findings

The study suggests that teachers in both groups increase their use of technology in the classroom during and after training in the process of integrating technology into the curriculum. Further, teachers do not alter their existing teaching methods as they integrate technology, but use technology in ways that support their current classroom practices or educational experiences. The study confirmed the existence of intrinsic and extrinsic barriers that interfere with teachers' abilities to integrate technology into the classroom curriculum.

When comparing delivery methods groups, this study found that the OL group began the course with a higher average skill level in all parts of the survey instrument than the F2F group. The skill level growth in Basic Computer Use (Part A) was the same for the OL and F2F delivery groups. The F2F group had higher levels of growth in Advanced Computer Use (Part B) and Teacher Internet Use (Part C). The posttest scores indicated that the OL delivery group completed the course with higher skill levels than the F2F delivery group in Basic Computer Use (Part A). The F2F delivery group completed the course with higher skill levels in Advanced Computer Use (Part B) and Teacher Internet Use (Part C).

There were noted differences between the OL section and the F2F section in their identified Stages of Concern. Both groups focused early on informational (Stage 1) and personal (Stage 2) concerns. Both groups indicated low levels of concern related to time, logistics, and management concerns (Stage 3). Both groups indicated increased levels of concern over time for the consequences of using technology with their students (Stage 4). Only the F2F section teachers indicated increased concerns about collaboration (Stage 5). Only the OL section teachers indicated increased concerns about modifications or alternatives to technology integration.

The level of use was a greater among those teachers enrolled in the F2F section of the course than those enrolled in the OL section. The teachers in the F2F section used cooperative groups more frequently than the teachers enrolled in the OL section. The use of demonstrations increased among those enrolled in the OL section. This could indicate that the F2F population benefited from the ability to see and interact with technology integration in an environment that closely resembled their own classroom settings. This is consistent with research on the influence past learning experiences have on current teaching practices because the F2F group had increased opportunity for cooperative group work and the OL section relied on demonstrations for a large percentage of their content materials (Dwyer et al., 1990a, 1990b). Both groups indicated improvements in classroom management with the use of technology.

Conclusions

Although the number of cases and the unique characteristics of each teacher investigated limits the generalizability of this study, the study provides insight into the individual experiences of seven PK-12 teachers as they participated in technology training, moving beyond the training classroom to the application of teaching methods that facilitated the integration of technology into their classroom curriculum. The success of the educational technology revolution cannot be judged like other educational innovations. It is the belief of this researcher that teachers and not technology are the driving force in the current movement. Therefore this study focuses on the experiences of the individual and not the aspects of the integrating technology.

The intent of this study was to provide developers and instructors of technology integration courses and teacher preparation programs with information that would support the future development of an effective model for training teachers and support staff to integrate technology into the classroom. This study adds to the existing literature on effective training in technology integration by focusing on the individual skills, needs, and classroom environments of those individuals involved in the training rather than the implementation of the innovation. "Cookie cutter" courses that focus on basic skills and application training will not enable the transfer of skills from the training environment to the classroom. Frequent modeling of technology-enhanced instruction directly related to the classroom environment would better facilitate transfer of technology skills and use (Studler & Wetzel, 1999). Training for technology

integration must incorporate in its structure the instructional methods and classroom practices that facilitate technology integration.

If teacher educators are to facilitate technology integration for different types of teachers, they need to design and implement learning environments that (a) are learner-centered, (b) encourage collaboration, (c) promote discovery, and (d) provide activities that are engaging and relevant to the individual needs and environments of the learners. Teachers will develop visions of technology integration based on their own educational experiences. Therefore training programs must provide rich extended experiences in technology integration and model effective practices and innovative uses of technology that improve teaching and learning. Through the results of this study, instructors will understand better how to facilitate training in the integration of technology for different types of teachers. In addition, insight will be provided in differential impact of OL training and F2F training.

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Web-based Teacher Education Technology Course

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Abstract: The teacher education technology course that is a standard through out the teacher candidate's plan of study at the majority of teacher education institutions has become a course under a constant state of revision.

Introduction

Due to the numerous areas of growth and further understanding of educational technology over the past five year period, the growth in the hardware and software tools available for use within the course structure, as well as the inclination of university faculty facilitating methods coursework and the inclination of these faculty to integrate technology at a growing rate, the teacher education technology course must be revised to maintain the leading edge of appropriate and successful technological inclusion.

History

Over the previous three- to five-year period there has been an unprecedented growth in Web-based and Web-enhanced coursework. As an area of significance, the Instructional Technology specialization area at the University of Houston-Clear Lake has designated that the teacher education technology course be Web-based. The incremental shift in technological possibilities and support factors has introduced numerous levels of strength, as well as areas in which dedicated decisions must be emphasized to ensure the highest levels of learner support and technological inclusion within a learning environment is available. The inclusion of national technology standards are also of primary importance, to ensure the teacher candidates meet their own educational technology needs as well as the needs of the learners. Therefore, the inclusion of national technology standards for both the teacher candidate and the PreK-12 learners, instructional design that emphasizes the real-world design and development of age-appropriate and technologically infused lessons for the learning environment, and a clear understanding of the theories, philosophies and curricular elements that must be considered are integrated into the Web-based teacher education technology course.

Analysis and Design

An analysis of the teacher education technology course, whether this be the traditional face-to-face mode of instruction or a Web-based model of instruction, indicated a lack of consistency and overall structure to the course. Due to the important nature of this course as the springboard for the integration of instructional technology within the teacher candidate's methods coursework, the designation of an exemplary Web-based teacher education technology course was deemed imperative. This model course structure would become the standard through which the face-to-face, Web-enhanced and Web-based courses would focus its efforts.

The design of the Web-based teacher education technology course has been through several revisions over the previous three-year period at our university. The latest project manager and subject matter expert to oversee the design and development of the course is the latest of three persons.

Development

The development timeline for the Web-based teacher education technology course consists of a year's period, wherein one semester is allocated for design, one semester is allocated for development, and the final of the three semesters is allocated towards testing and evaluation. The course is delineated into the following units of study, which have been integrated into the course:

- Internet
- Copyright/Ethics/Equity/Legal
- Hardware/Software/Networking Tools
- Software Tools/Emerging Technologies
- Software Evaluation
- Learning Theory/Assistive Technology
- Storyboarding/Project Management/Assessment
- Web Design
- Graphics

- Video/Audio/CD-Rom
- Word Processing/Desktop Publishing
- Spreadsheets
- Databases
- Presentations

Further, there are specific aspects delineated within each of the units of instruction. The instructional elements, which are implemented for purposes of flow and to develop a comfort level within the learner's conceptual framework of understanding, are noted below:

- Objective
- Instructional Events
  - Readings
  - Best practice examples
  - Guided practice/tutorial
- Product Creation
- Peer Evaluation
- Discussion
  - Bulletin board
  - Chat room
- Reflection
  - Synthesis of skills and knowledge gained
  - Application of skills and knowledge gained in a learning environment

The units of instruction are laid out in a similar manner, so as to develop a sense of flow and comfort for the learners. Due to this level of comfort the learners can focus upon the information included within the unit, instead of focusing upon the unit layout.

Implementation and Evaluation

The Web-based teacher education technology course is scheduled for implementation at the beginning of the third semester within the development cycle. During such time, the course will be evaluated within a "live" classroom environment, wherein both instructors and teacher candidates will offer constant feedback concerning positive factors related to the course as well as areas for further consideration.

Conclusions

The scope and sequence for the Web-based teacher education technology course has been developed in order to meet the ISTE NETS*T (International Society for Technology in Education, 2000) standards. Further, the International Society for Technology in Education (ISTE) states that "Technology must become an integral part of the teaching and learning process in every setting supporting the preparation of teachers" (International Society for Technology in Education, 2001, paragraph 2). As such, "A combination of essential conditions is required for teachers to create learning environments conducive to powerful uses of technology. The most effective learning environments meld traditional approaches and new approaches to facilitate learning of relevant content while addressing individual needs" (International Society for Technology in Education, 2001, paragraph 1). As the purpose of the teacher education technology course is to aid the teacher candidates towards the integration of technology, it is appropriate to offer the most appropriate methods towards modeling the appropriate and successful integration of technology.

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